VIII. Airport Layout Plan

The ALP set provides a scaled, graphical representation of existing and proposed airfield configurations and airport facilities, along with pertinent clearance and dimensional information required to show relationships to applicable FAA standards. The ALP set also illustrates physical features and land uses on and off the airport property that may affect the navigable airspace or the ability of the airport to expand.

The ALP set is a public document serving as a record of aeronautical requirements, both existing and proposed. For the airport sponsor, it is a map of the existing airport facilities and airfield configuration and a guideline for future development. It is a reference for community deliberations on land use proposals and budget resource planning. The FAA uses the ALP as a planning tool for review of airport development grant applications under the AIP and refers to it in review of proposed construction projects that may affect navigable airspace.

The ALP for O'Hare illustrates the proposed airport development plan, which was generated from the analysis and refinement of a series of alternatives. The ALP set for this Master Plan consists of the following drawings:

- Existing Airport Layout Plan
- Future Airport Layout Plan
- Airport Data Sheet
- Existing Terminal Area Plan – Core
- Existing Terminal Area Plan – East
- Future Terminal Area Plan – West
- Future Terminal Area Plan – Core
- Future Terminal Area Plan – East
- Phase 1A Concept Plan
- Phase 1 Concept Plan
- Ultimate Completion Concept Plan
- Future Runway Declared Distances
- Existing Runway 4L Approach Surface
- Existing Runway 22R Approach Surface
- Existing Runway 4R Approach Surface
- Existing Runway 22L Approach Surface
- Future Runway 9L Approach Surface (1 of 2)
- Future Runway 9L Approach Surface (2 of 2)
- Future Runway 27R Approach Surface
- Future Runway 9C Approach Surface

- Future Runway 27C Approach Surface
- Future Runway 9R Approach Surface
- Future Runway 27L Approach Surface
- Future Runway 10L Approach Surface
- Future Runway 28R Approach Surface
- Future Runway 10C Approach Surface
- Future Runway 28C Approach Surface
- Future Runway 10R Approach Surface (1 of 6)
- Future Runway 10R Approach Surface (2 of 6)
- Future Runway 10R Approach Surface (3 of 6)
- Future Runway 10R Approach Surface (4 of 6)
- Future Runway 10R Approach Surface (5 of 6)
- Future Runway 10R Approach Surface (6 of 6)
- Future Runway 28L Approach Surface
- Existing Runway 9L Approach Surface
- Existing Runway 27R Approach Surface
- Existing Runway 9R Approach Surface
- Existing Runway 14L Approach Surface
- Existing Runway 32R Approach Surface
- Existing Runway 14R Approach Surface
- Existing Runway 32L Approach Surface
- Existing Runway 18 Approach Surface
- Existing Runway 36 Approach Surface
- Future Airport Layout Plan – Overall Part 77 Surfaces
- Future Airport Layout Plan – Inner Part 77 Surfaces
- Future Runway Approach Profiles
- Existing On-Airport Land Use Plan
- Future On-Airport Land Use Plan
- Existing Off-Airport Land Use Drawing

Reduced-size copies of the 50 sheets of the ALP Set are included in **Appendix E**.

8.1 Existing Airport Layout Plan

The Existing ALP is a graphical representation of the existing Airport and its immediate surroundings. Included in the plan is information relating to: existing airfield pavement with

associated clearances, surfaces, critical areas, and dimensions; terminal, support, and ancillary facilities with associated building identification; ground access facilities and service roads; and avigation easements, the Airport property line, and the county line. The Existing ALP shows the Airport configuration, the location of airside and landside facilities, and the surrounding area existing at the date of publication.

Key elements of the Existing ALP include:

- *Airfield:* The existing airfield consists of three sets of parallel runways, 14L-32R, 14R-32L, 9L-27R, 9R-27L, 4L-22R, and 4R-22L, and one north-south runway, 18-36. Runway 14R-32L, with a width of 200 feet, meets ADG VI runway width standards. Runway 18-36 is 150 feet wide and is restricted to ADG II aircraft. All other runways are 150 feet wide and meet ADG V standards.
- *Terminal Facilities:* There are four existing passenger terminals shown on the Existing ALP, Terminals 1, 2, 3, and 5. An FIS facility is located within Terminal 5 for processing international operations. All terminals are connected via the ATS, which links with a station located in the long-term surface parking Lot E.
- *Support/Ancillary Facilities:* The support facilities shown on the Existing ALP are spread throughout the Airport. The main cargo area is located in the southwest quadrant of the Airport with additional cargo operations located at the former military site. The primary aircraft maintenance facilities are located in the northwest quadrant. Additional facilities are located to the southeast in the O'Hare Express Southeast area and to the north in the O'Hare Express North area. General aviation facilities are located at the former military site.
- *Ground Access Facilities:* Ground access to the Airport is provided from I-90 to the east via the Airport access road, I-190. Public parking is provided in the elevated parking structure and surface lots in the terminal core area, the public surface lot at Terminal 5, and long-term public surface lots in the Northeast Quadrant. Rental car operators are located at the rental campus in the Northeast Quadrant. Employee parking lots are provided at various locations throughout the Airport.

8.2 Future Airport Layout Plan

The Future ALP is a graphical representation of the proposed airport configuration and facilities recommended for development of the Airport. Included in the plan is information relating to: proposed airfield pavement with associated clearances, surfaces, critical areas, and dimensions; proposed terminal, support, and ancillary facilities with associated building identification and relocation information; proposed ground access facilities and service roads; and avigation easements, the future Airport property line, and the county line.

Key elements of the Future ALP include:

- *Airfield:* The proposed future airfield configuration consists of six east-west parallel runways and two parallel runways in the 4-22 orientation. Development of the future airfield will require the relocation of one of the parallel runway sets, 14L-32R and 14R-32L, relocation of the north-south runway, 18-36, and development of one additional runway. Existing Runways 9L-27R and 9R-27L will be extended to the west, and 4L-22R and 4R-22L will remain in their existing configuration. Two of the relocated runways will be 200 feet wide to accommodate ADG VI aircraft and the remaining runways will be 150 feet wide to

accommodate ADG V aircraft. Designated taxiways meeting ADG VI standards are provided for aircraft taxiing to and from the terminal areas and ADG VI runways.

- *Terminal Facilities:* Proposed terminal facilities shown on the Future ALP include modifications to the existing core terminal area and existing east terminal area and the development of a new west terminal area. In the terminal core area, the proposed modifications are an extension to Concourse K, the reconfiguration of Concourse L, and the development of Terminal 4. Terminal 6 will be developed in the east terminal area. The west terminal area will include the development of Terminal 7 and a satellite concourse. FIS facilities will be provided in Terminals 4, 5, and 7 for processing international operations. ADG VI aircraft can be accommodated at Terminals 5, 6, and 7. An underground APM system will be developed to connect Terminal 7 and the Terminal 7 Satellite to the existing terminal core and the ATS will be realigned to include a station for Terminal 6.
- *Support/Ancillary Facilities:* Proposed support and ancillary facilities necessary to meet future facility requirements have been shown on the Future ALP. Existing facilities that will be impacted by airfield development plans have been identified and provided with approximate future locations and access within the Airport property. General aviation facilities will be relocated to the north side of the old military ramp
- *Ground Access Facilities:* Future roadway access will be provided to the west side of the Airport and to the new west terminal. Irving Park Road, the Irving Park Road/York Road intersection, and Mount Prospect Road facilities will be realigned. Several roadway improvements will enhance circulation in the Northeast Quadrant and provide access to the terminal facilities on the east side of the Airport. The development of three new public parking structures, expansion of the Terminal Core elevated parking structure, expansion of the existing long-term surface parking lot, and development of a new surface parking lot will provide a total of 41,660 public parking spaces. The ATS will be extended and the maintenance yard relocated with a station added at the long-term parking structure in the Northeast Quadrant. Rental car operators will be provided with new facilities on the west side of the Airport as well as a new consolidated rental car facility with a connection to the ATS on the east side of the Airport. Additional employee parking will be provided in the Southwest and in the Northwest Quadrants of the Airport.

8.3 Airport Data Sheet

The Airport Data Sheet includes pertinent information on key existing and future Airport facilities shown on the Existing and Future Airport Layout Plans. The information is classified into Wind Rose and Wind Coverage Tables, an Airport Data Table, and a Runway Data Table.

The information contained in the tables includes:

- *Wind Rose and Wind Coverage Tables* – Information is provided for All Weather Conditions, VFR, and IFR and is summarized for each set of runways as well as for the entire airfield. Historical wind data was obtained for O'Hare for the ten-year period beginning on January 1991 and ending on December 2000.
- *Airport Data Table* – This table presents a summary of key geographic, meteorological, and operational data for the Airport in both existing and future configurations. The information assists in classification of the Airport and sets out the broad design criteria used for facility planning.

- *Runway Data Table* – This table presents key physical, geometric, and operational data specific to each runway. Data includes the precise location and elevation of each runway end, runway length and width, pavement strength and surface treatment, navigational aids and lighting, and applicable approach minima and declared distances.

8.4 Terminal Area Plans

The terminal area plans are large-scale drawings of the existing and future terminal areas represented on the airport layout plans. The drawings provided additional detail about buildings, apron areas, and taxiways in the vicinity of each terminal area. The following sections outline the individual drawings included in the ALP set.

8.4.1 Existing Terminal Area Plan – Core

Existing Terminal Area Plan – Core is a large-scale representation of the existing Terminal Core Area detailed in the Existing ALP. Included in the plan is information relating to clearances, dimensions, terminal building top elevations, and building identification. The core area consists of three terminals and eight concourses. Terminal 1 includes Concourses B and C, Terminal 2 includes Concourses E and F, and Terminal 3 includes Concourses G, H, K, and L.

8.4.2 Existing Terminal Area Plan – East

Existing Terminal Area Plan – East is a large-scale representation of the existing East Terminal Area detailed in the Existing ALP. Included in the plan is information relating to clearances, dimensions, terminal building top elevations, and building identification. The East Terminal Area consists of Terminal 5. An FIS facility is located within the terminal for processing international operations.

8.4.3 Future Terminal Area Plan – West

Future Terminal Area Plan – West is a large-scale conceptual plan of the proposed West Terminal Complex detailed in the Future ALP. Included in the plan is information relating to clearances, dimensions, proposed buildings, proposed ground access, proposed service roads, and building identification.

The future West Terminal Complex includes:

- Development of Terminal 7, which will include an FIS facility for processing international operations and will be capable of accommodating ADG VI aircraft
- Development of Terminal 7 Satellite Concourse
- Development of the underground APM system with two stations, one at the terminal building complex and the other at the satellite, and an APM maintenance and storage yard to the northwest of Terminal 7
- Development of ground access to Terminal 7 from York Road and Thorndale Avenue
- Development of the West Terminal parking structure, limo staging, taxi staging, and rental car quick turn around areas
- Development of the West Terminal heating and refrigeration/co-generation plan

8.4.4 Future Terminal Area Plan – Core

Future Terminal Area Plan – Core is a large-scale conceptual plan of the proposed Terminal Core Area detailed in the Future ALP. Included in the plan is information relating to clearances, dimensions, proposed buildings, proposed ground access, proposed service roads, and building identification.

The future Terminal Core Area includes:

- Extension of Concourse K
- Development of Terminal 4 with curb front access, upper and lower level roadway enhancements, and reconfiguration of Concourse L and addition of an FIS facility for processing international operations
- Development of the underground APM system and station in Terminal Core Area for connection to the West Terminal Complex
- Expansion of the Terminal Core Area elevated parking structure
- Reconfiguration of Terminal 2

8.4.5 Future Terminal Area Plan – East

Future Terminal Area Plan – East is a large-scale conceptual plan of the proposed East Terminal Area detailed in the Future ALP. Included in the plan is information relating to clearances, dimensions, proposed buildings, proposed ground access, proposed service roads, and building identification.

The future East Terminal Area development includes:

- Development of Terminal 6 with associated curb front access, and upper and lower level roadway enhancements
- Realignment of the ATS and development of the Terminal 6 ATS station
- Development of Terminal 6 ground access roadway and Balmoral Avenue Extension over Mannheim Road
- Reconfiguration of Terminal 5 and I-190 roadway improvements

8.5 Implementation Concept Plans

The implementation concept plans provide an overview of the major phases anticipated during implementation of the Future ALP. The phasing plans are conceptual and subject to revision based on detailed ongoing phasing studies. Details on the drawing provided for each phase are included in the following sections.

8.5.1 Phase 1A Concept Plan

The Phase 1A Concept Plan is a conceptual overview of the first of three major development stages. The concept represents a snapshot of planned facilities in place at the completion of Phase 1A. It omits any existing facilities that will no longer be required by phase completion and any facilities planned for subsequent phases. The plan is preliminary and is subject to revision based upon detailed phasing studies currently being conducted by the Airport. Included in the plan is information

relevant to completion of Phase 1A relating to: proposed airfield pavement with associated clearances, surfaces, critical areas, and dimensions; proposed terminal, support, and ancillary facilities with associated building identification and relocation information; proposed ground access facilities and service roads; and avigation easements, the Airport property line, and the county line.

Phase 1A includes:

- Development of Runway 9L-27R, associated parallel taxiway, and east north-south taxiway connector
- Development of the north ATCT
- Development of a 680 acre-feet detention basin south of Structure 140
- Displacement of Runway 14L-32R threshold
- Relocation of Willow-Higgins Creek
- Relocation of Mount Prospect Road and Guard Post #1
- Expansion of the fuel farm
- Expansion of Terminal Core Area elevated parking structure
- Development of structured parking in the Northeast Quadrant
- Development of O'Hare Express North
- Relocation of impacted Airport buildings and development of future Airport buildings

8.5.2 Phase 1 Concept Plan

The Phase 1 Concept Plan is a conceptual overview of the second of three major development stages. Phase 1 Concept represents a snapshot of planned facilities in place at the completion of Phase 1. It omits any existing facilities that will no longer be required by phase completion and any facilities planned for subsequent phases. The plan is preliminary and is subject to revision based upon detailed phasing studies currently being conducted by the Airport. Included in the plan is information relevant to completion of Phase 1 relating to: proposed airfield pavement with associated clearances, surfaces, critical areas, and related dimensions; proposed terminal, support, and ancillary facilities with associated building identification and relocation information; proposed ground access facilities and service roads; and avigation easements, the future Airport property line, and the county line. Facilities developed for Phase 1A are incorporated into Phase 1 Completion.

Phase 1 Completion includes:

- Phase 1A Completion development items
- Extension of Runway 10L-28R, extension of associated parallel taxiway, and connecting taxiways
- Development of Runway 10C-28C, associated parallel taxiway and connecting taxiways
- Decommissioning of Runway 18-36
- Development of the West Terminal Satellite
- Development of the APM and stations at the existing Terminal Core Area and the West Terminal Satellite

- Reconfiguration and expansion of south detention basin to 1,700 acre-feet
- Reconfiguration and expansion of West Terminal detention basin to 300 acre-feet
- Displacement of Runway 14R-32L threshold
- Relocation of Union Pacific Railroad and Bensenville Ditch
- Irving Park Road/York Road intersection improvements
- Relocation of the ASR-9 to the south and development of a new ASR-9 in the north
- Development of rental car facilities
- Relocation of impacted Airport buildings and development of future Airport buildings

8.5.3 Ultimate Phase Concept Plan

The Ultimate Phase Concept Plan is a conceptual overview of the Airport configuration after completion of the third and final stage of development. The Ultimate Concept Plan is intended to represent a snapshot of planned facilities in place at completion, and it omits any existing facilities that will no longer be required. Included in the plan is information relevant to ultimate phase completion relating to: proposed airfield pavement with associated clearances, surfaces, critical areas, and related dimensions; proposed terminal, support, and ancillary facilities with associated building identification and relocation information; proposed ground access facilities and service roads; and avigation easements, the future Airport property line, and the county line.

8.6 Future Runway Declared Distances

The Future Runway Declared Distances Plan presents the declared distances proposed for future Runways 10L-28R and 10C-28C. The plan also includes information on the obstructions controlling the distances available on both runways. The declared distances detailed in the drawing include:

- Landing Distance Available (LDA),
- Accelerate-Stop Distance Available (ASDA),
- Takeoff Run Available (TORA), and
- Takeoff Distance Available (TODA).

8.7 Airport Airspace Drawings

Airspace and approach plans graphically depict imaginary surfaces that define the navigable airspace surrounding an airport runway system. The criteria used to define these surfaces are contained in 14 CFR Part 77, Objects Affecting Navigable Airspace. Physical objects that penetrate the imaginary surfaces are considered to be obstructions and may constitute a hazard to the safety of air navigation. The FAA reviews obstructions to determine if a hazard exists.

Future Part 77 surfaces and associated obstructions for the Airport are depicted in plan on the Overall and Inner Part 77 Surfaces sheets. The approach surfaces are depicted in profile for each future runway on the Future Runway Approach Profiles sheet. These drawings are discussed in more detail in the following sections.

8.7.1 Part 77 Surfaces

The Part 77 Surfaces are detailed on two plans, Future ALP Overall Part 77 Surfaces and Future ALP Inner Part 77 Surfaces, to provide information on the total extent of the surfaces and close-in detail. The sheets show several imaginary obstruction control surfaces established in relation to the Airport and to each runway as defined by 14 CFR Part 77. Dimensions of most of the surfaces are controlled by the category of approach planned for each runway (i.e., visual, non-precision or precision). Penetration of these surfaces by fixed or moveable objects constitutes an obstruction to air navigation. Part 77 standards assist in the protection of navigable airspace from encroachments by obstructions that may be detrimental to safe airport operations. The following surfaces are presented on the Part 77 Plans.

1. *Primary Surfaces* – These surfaces are longitudinally centered on each runway. Each surface extends 200 feet beyond each end of the runway and has an elevation equal to that of the runway centerline. The width of the surface is prescribed for the most precise instrument approach procedure planned for either end of the runway. The future airfield at O'Hare will include precision instrument approaches for Runways 4R, 9L, 9C, 9R, 10L, 10C, 10R, 22L, 22R, 27L, 27C, 27R, 28L, 28C, and 28L. The primary surfaces for these runways will be 1,000 feet wide. The primary surface for Runway 4L, a non-precision instrument runway with visibility minimums greater than ¾ mile, is controlled by the precision approach to 22R and will be 1,000 feet wide.

2. *Approach Surfaces* – These surfaces are longitudinally centered on the extended runway centerline and expand outward and upward from each end of the primary surface. The size and slope of the approach surface is based upon the planned approach category.

3. *Transitional Surfaces* – These surfaces extend outward and upward from the lateral edges of all primary and approach surfaces at a slope of 7:1. The transitional surface ends at its intersection with either the horizontal or conical surface, except for those portions of the precision approach surface that project through and beyond these surfaces. The overall width of the transitional surfaces adjacent to approach surfaces that extend beyond the conical surface is 5,000 feet from the edge of the approach surface measured perpendicular from the runway centerline.

4. *Horizontal Surfaces* – This surface is a plane located 150 feet above the established airport elevation. Its perimeter is composed of arcs centered on the midpoint of the end of each primary surface, connected by lines tangent to the arcs. The appropriate arc radius depends on the approach category of the runway: visual approaches require a 5,000-foot radius; precision approaches require 10,000 feet.

5. *Conical Surfaces* – This surface extends outward and upwards from the periphery of the horizontal surface at a slope of 20:1, for a horizontal distance of 4,000 feet.

Obstructions that were identified as penetrating the Part 77 surfaces are shown on either the Future ALP Inner Part 77 sheet or on the individual inner approach sheets for each runway end. Identified obstructions are tabulated along with recommended mitigating actions.

Several obstructions are detailed on the Inner Part 77 Surfaces sheet. The existing ATCT penetrates the horizontal surface and is marked with obstruction lights. In the Southwest Cargo Area, three

buildings, ARFF Station #1, the Northwest Cargo Building, and the Federal Express Freight Building, penetrate the future Runway 10C-28C transitional surface. Significant cost and operational impacts precluded siting the thresholds for future Runway 10C-28C to clear these objects. The thresholds were sited such that the buildings would not penetrate the TERPS Missed Approach Obstacle Clearance Surfaces. Obstruction lights will be installed on these buildings and existing light poles will be removed or lowered to minimize penetrations. Off-Airport property obstructions identified on the Inner Part 77 Sheet include a radio antenna tower and water tower that will penetrate the approach surfaces of Runways 9C and 10R, respectively. These structures will be marked with obstruction lights.

8.7.2 Future Runway Approach Profiles

The Future Runway Approach Profiles Sheet provides a composite profile of the existing terrain and any significant objects across the Part 77 approach surface for each future runway. The profiles extend from the runway end to 10,000 feet beyond the end of the Part 77 primary surface and show the approach surface, the horizontal surface and, where applicable, the threshold siting surface. Any obstructions shown penetrating the inner approach surface are detailed on the individual inner approach sheets for each runway end or the Future ALP Inner Part 77 sheet.

8.8 Inner Approach Surfaces

The Inner Approach Surface Sheets illustrate the plan and profile views of the inner approach surface of each existing and future runway end. The inner approach surface shown is the section of the 14 CFR Part 77 approach surface extending from the end of the primary surface out to the point where the surface reaches an elevation of at least 100 feet above the end elevation of the associated runway.

Each plan view depicts the boundaries of the approach surface and adjacent transitional surfaces and the location of all significant objects enclosed by this area. The profile view depicts the approach surface slope, existing and proposed terrain profiles along the extended runway centerline, and the height of identified significant objects. Separate tables on each approach sheet identify significant objects by type, overall height, degree of surface penetration, and the proposed disposition of the object if it is determined to be an obstruction.

All new runway thresholds, with the exception of future Runways 9L, 9C, and 10R, were sited such that the Part 77 approach surface clears any objects that could not be removed. Significant cost and operational impacts precluded siting the thresholds for future Runways 9L, 9C, and 10R to clear all objects. Section 8.7.1, Part 77 Surfaces, details the obstructions identified beyond the inner approach area.

On the inner approach to future Runway 9L, the north edge of the Part 77 approach surface is occasionally penetrated by trains moving on the existing railroad. The threshold was sited such that trains would not penetrate the Part 77 surface through the approach light plane or the TERPS Final Approach Obstacle Clearance Surface. Additional mitigation measures, such as obstruction lighting, may be required. On the inner approach to future Runway 10R there are two buildings that penetrate the approach surface, identified on Sheet 33 of the ALP Set as B85 and B86. The threshold was sited such that these buildings do not penetrate the TERPS Final Approach Obstacle Clearance Surface. Obstruction lighting will be required on these buildings.

8.9 Land Use Plans

Existing and future on-Airport land use plans and an existing off-Airport land use drawing are included in the ALP set. These drawings are outlined in the following sections.

8.9.1 Existing On-Airport Land Use Plan

The Existing On-Airport Land Use Plan graphically depicts land uses within the existing Airport property line. The areas depicted include:

- Terminal Area
- Airfield
- Support
- Cargo
- General Aviation
- Access & Parking
- Maintenance
- Former Military Area
- Open & Other
- Water Detention
- Avigation Easement
- Existing Buildings
- Airport Property Line
- Aircraft Operations Area (AOA)

8.9.2 Future On-Airport Land Use Plan

The Future On-Airport Land Use Plan graphically depicts the proposed land uses within the future Airport property line. The areas depicted include:

- Terminal Area
- Airfield
- Support
- Cargo
- General Aviation
- Access & Parking
- Maintenance
- Open & Other
- Water Detention
- Avigation Easement

- Existing Buildings
- Future Buildings
- Future Terminal Buildings
- Future Relocated Buildings
- Relocated Railroad
- Airport Property Line
- Aircraft Operations Area (AOA)

8.9.3 Existing Off-Airport Land Use Drawing

The Existing Off-Airport Land Use Plan graphically depicts land uses found in the vicinity of the Airport. The drawing provides guidance for maintaining compatible land uses and establishing appropriate zoning around the Airport. The plan covers an area approximately 20 miles in radius from the Airport. Sensitive land uses, such as schools, libraries, hospitals, nursing homes, and places of worship, are depicted along with:

- Airport Land
- Cemeteries
- Commercial / Mixed
- Industrial
- Institutional
- Mobile Homes
- Multi-Family Homes
- Single-Family Homes
- Park & Forest Preserve
- Water
- Mine / Quarry
- Vacant / Agricultural